Effects of Taproot Length on Shrub Transplant Survival

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&

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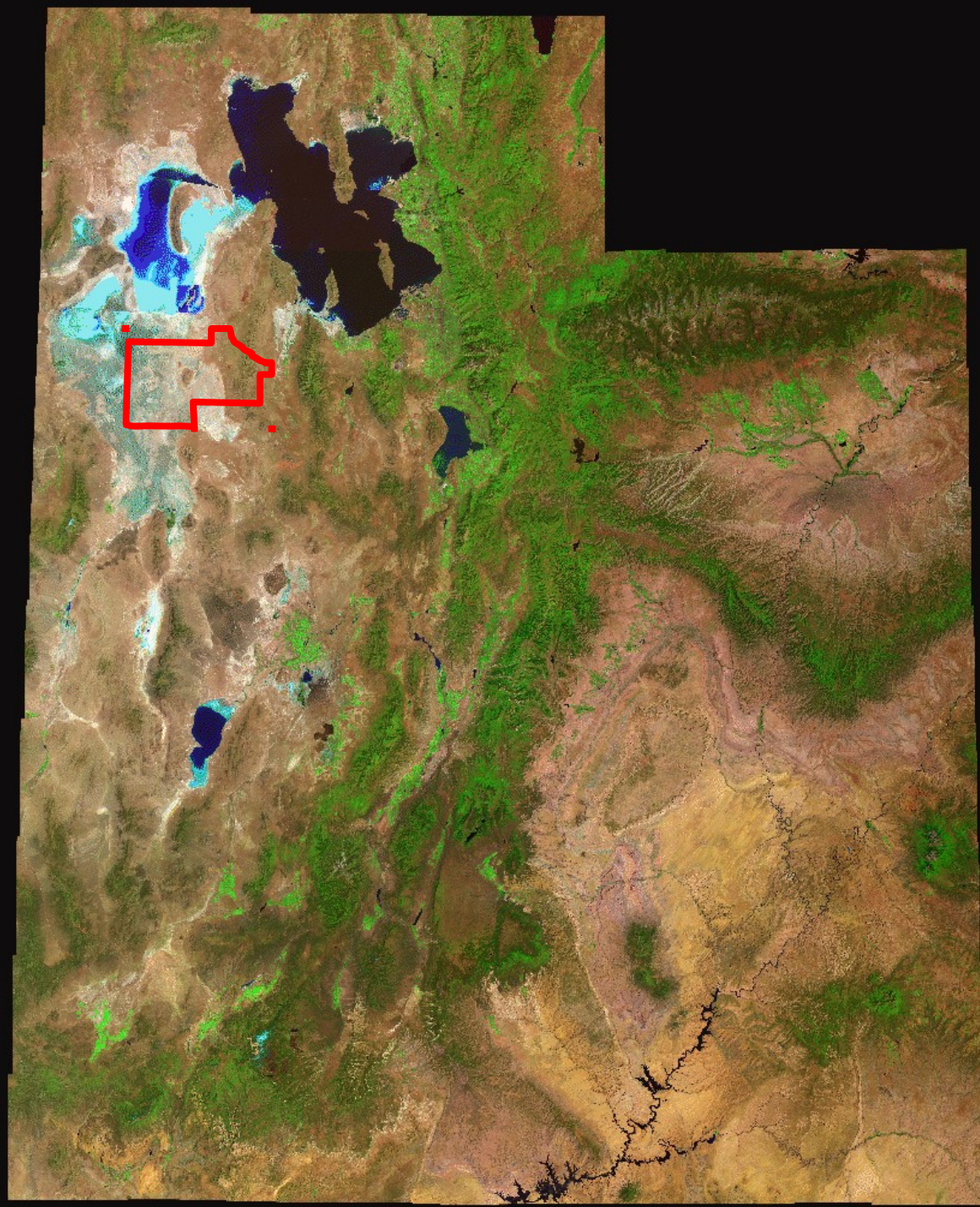
U. S. Army Dugway Proving Ground



Great Basin Rangelands

- Bare interstitial space reduces likelihood of large fires
- Low fire frequency (32-70 years)
- Few fire tolerant shrub species
- Episodic plant establishment

Cheatgrass Infested Rangelands

- Out competes native species
- Invades interstitial spaces
- Highly flammable and continuos fuel
- Increased fire frequency (3-5 years)

Results of Cheatgrass Invasion

- Increased number and size of wildfires
- Loss of tactical concealment cover
- Loss of floral and faunal diversity
- Extremely difficult to rehabilitate

Shrub Re-establishment Options

- Drill Seeding
- Broadcast seeding
- Transplanting
  - Bare root
  - Container stock
  - Root elongation pots
    - Joshua Tree National Park

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Direct Seeding vs. Transplanting

- Direct Seeding
  - Pros
    - Lower cost per acre
    - Large areas
    - Low labor cost
    - Mix grasses forbs & shrubs
  - Cons
    - Seedbed preparation
    - Some woody species require transplanting
    - Precipitation dependent
- Transplanting
  - Pros
    - Instant results
    - Increased success
  - Cons
    - High labor cost
    - High plant material cost

Root Elongation Pots

- Increases root mass and length

Root Elongation Pots

- Six inch PVC pipe: 18, 24, and 30 inch

Root Elongation Pots

- Hardware cloth bottom supported by stiff wire

The Project Objectives

- Determine the most efficient container size
- Cost effectiveness
- Species response
- Restore degraded areas around firing points

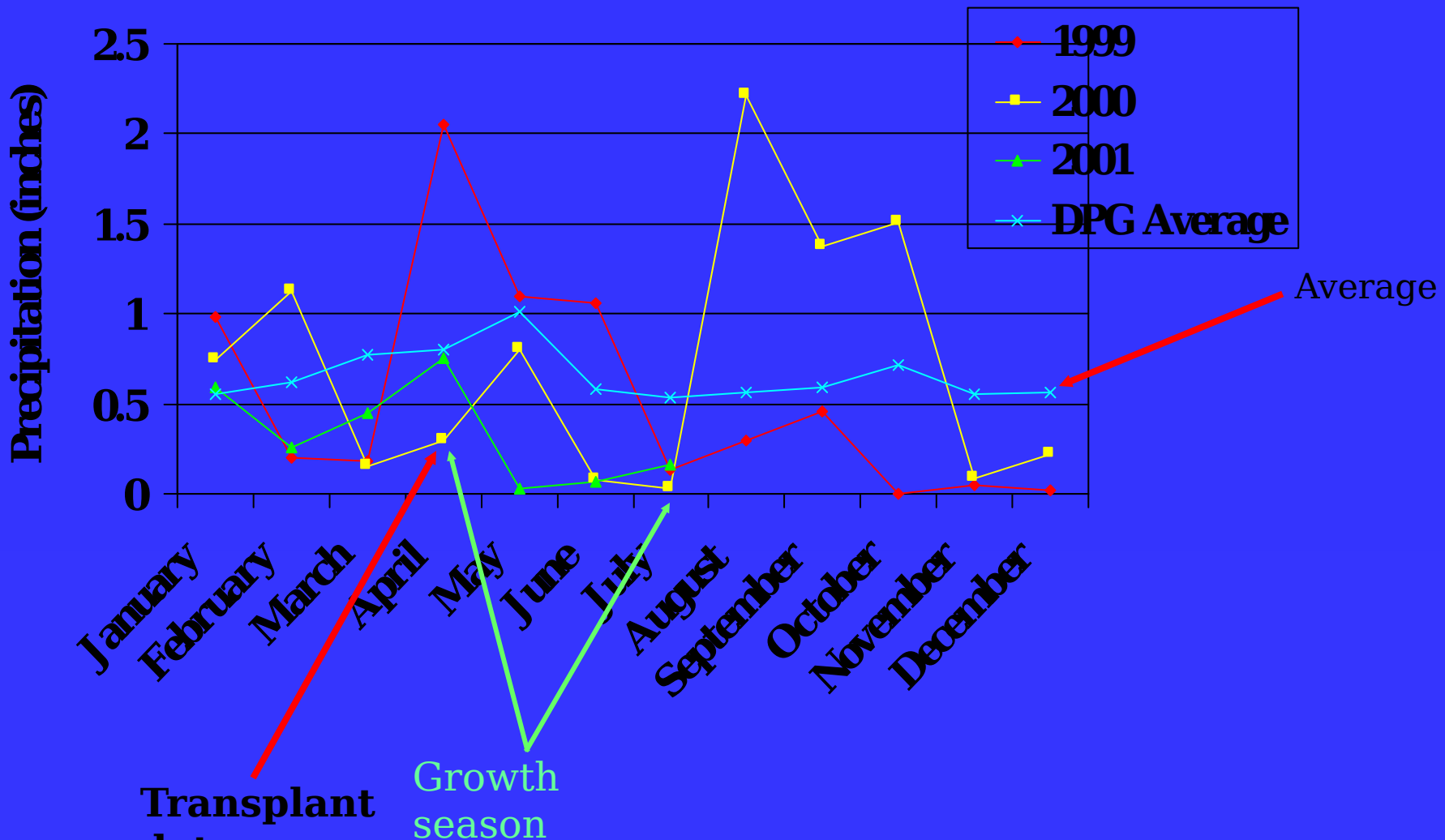
Methods for Transplanting

- Tractor mounted auger
- 36” holes
- Water pots prior to transplanting
  - reduces water stress
  - facilitates removal
- 1-2 gallons applied near top and bottom of column

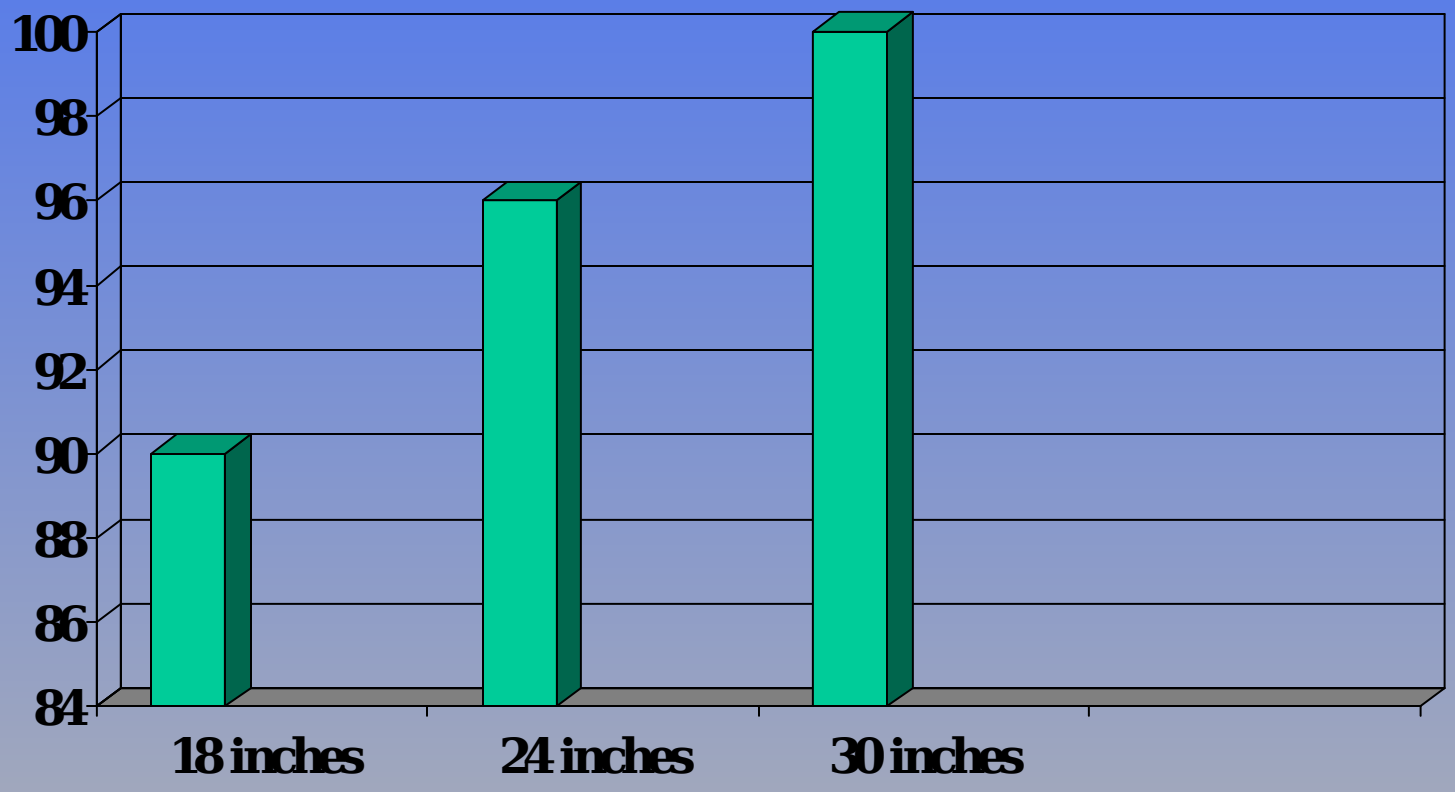
Transplant Species

Species	**18”**	**24”**	**30”**
Utah juniper (*Juniperus osteosperma*)	24	15	9
Big sagebrush (*Artemisia tridentata*)	58	36	32
Fourwing saltbush (*Atriplex canescens*)	46	31	25

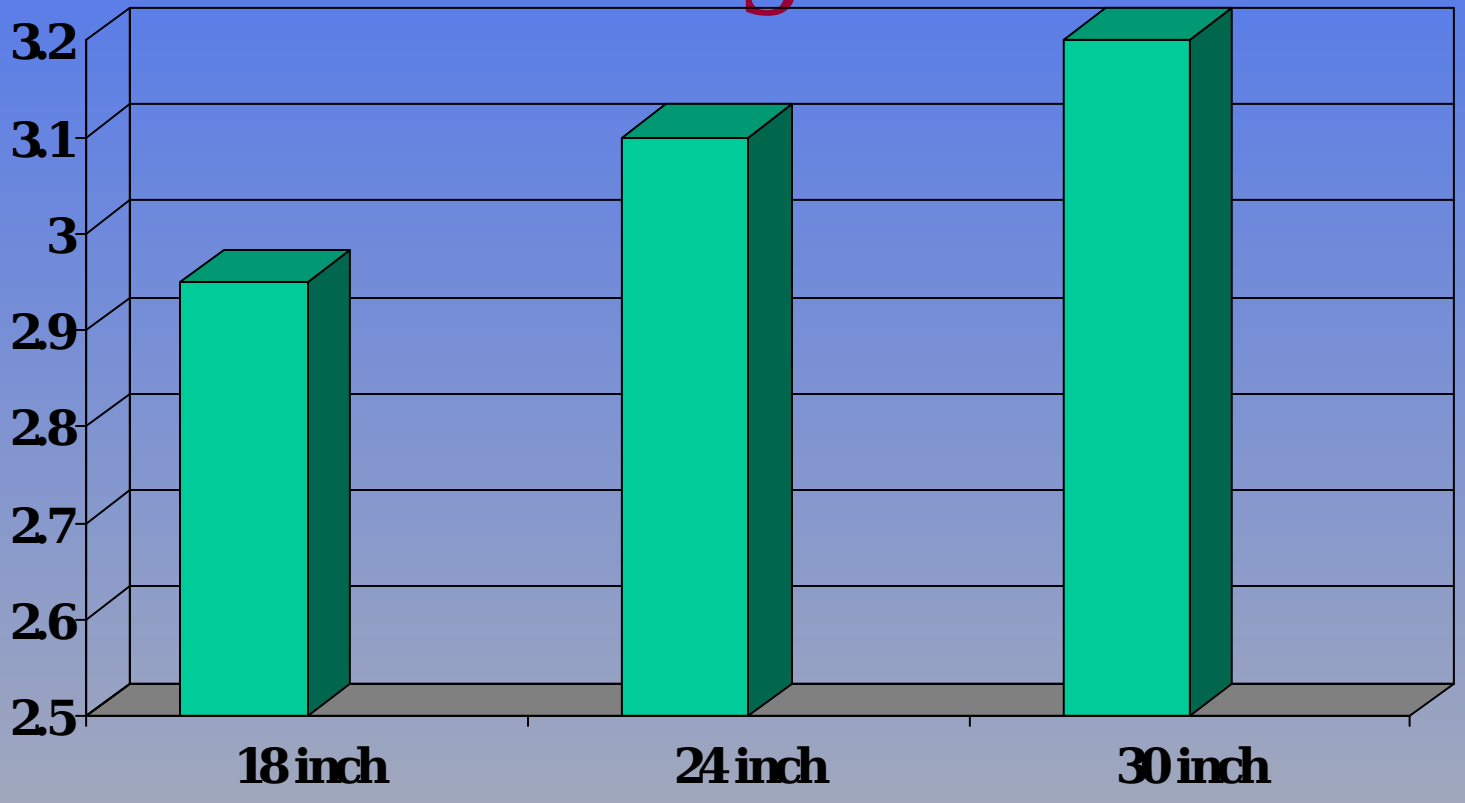
Three Year Precipitation & DPG Average



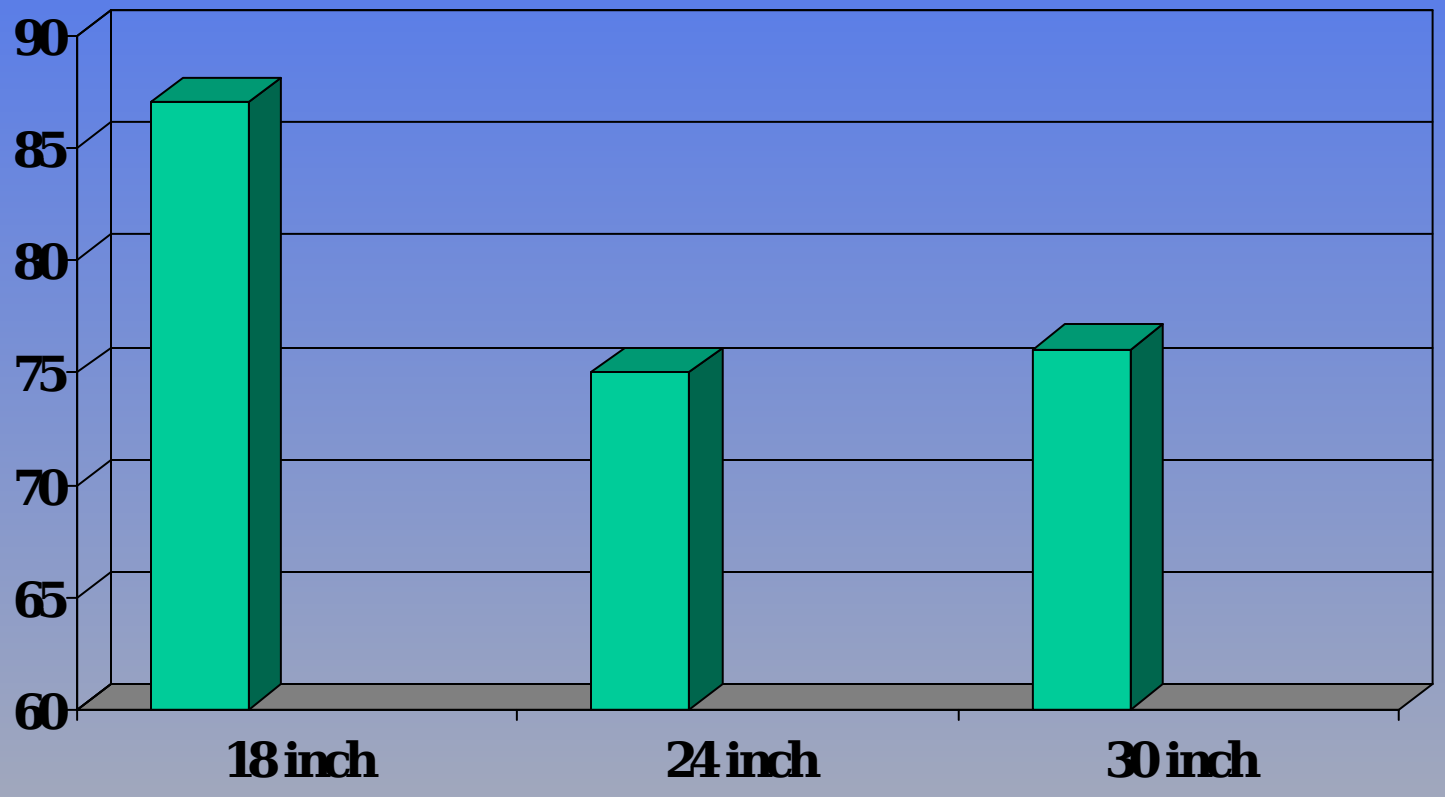
Saltbush Survival (Percentage)



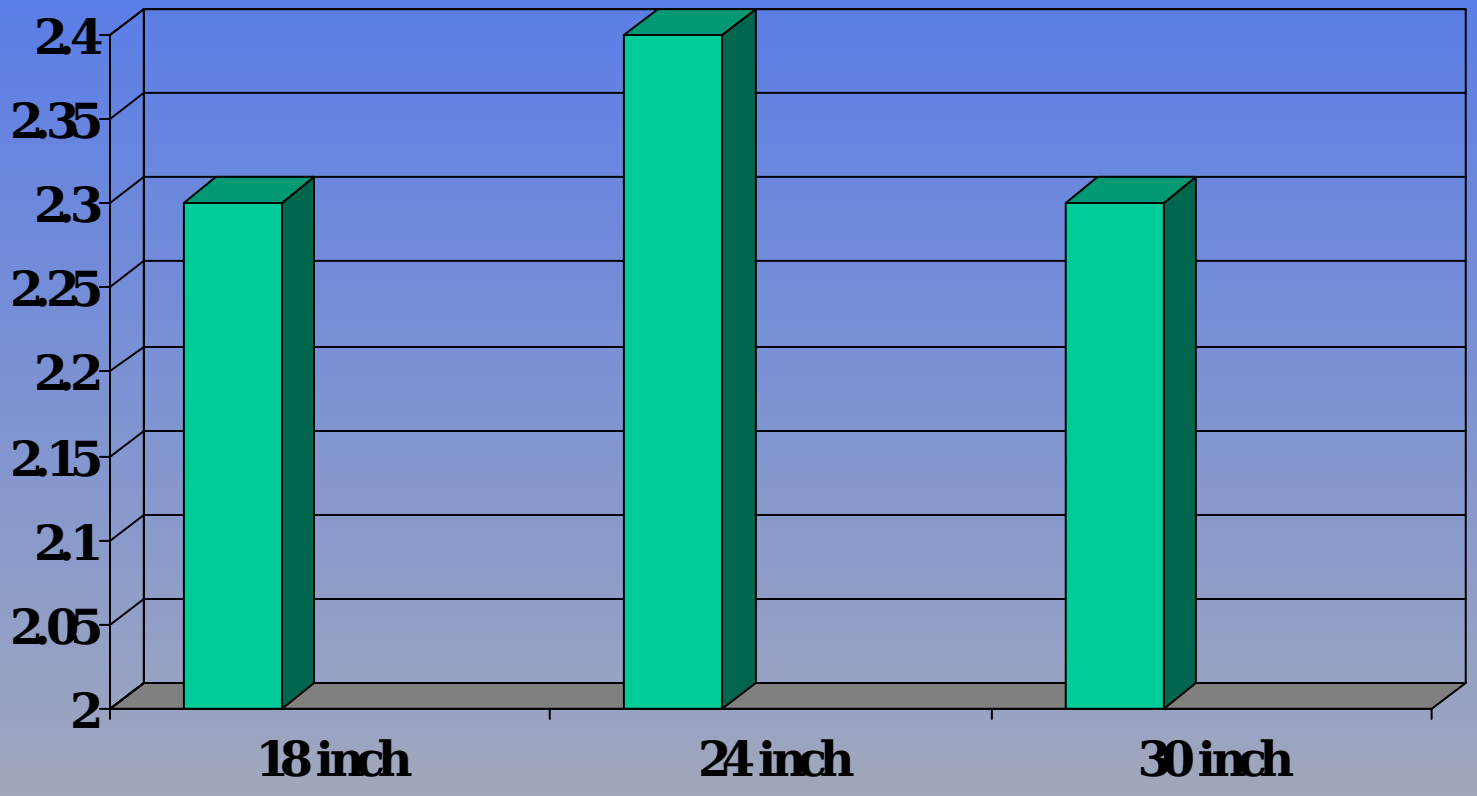
Fourwing Saltbush Condition Rating of Surviving Plants



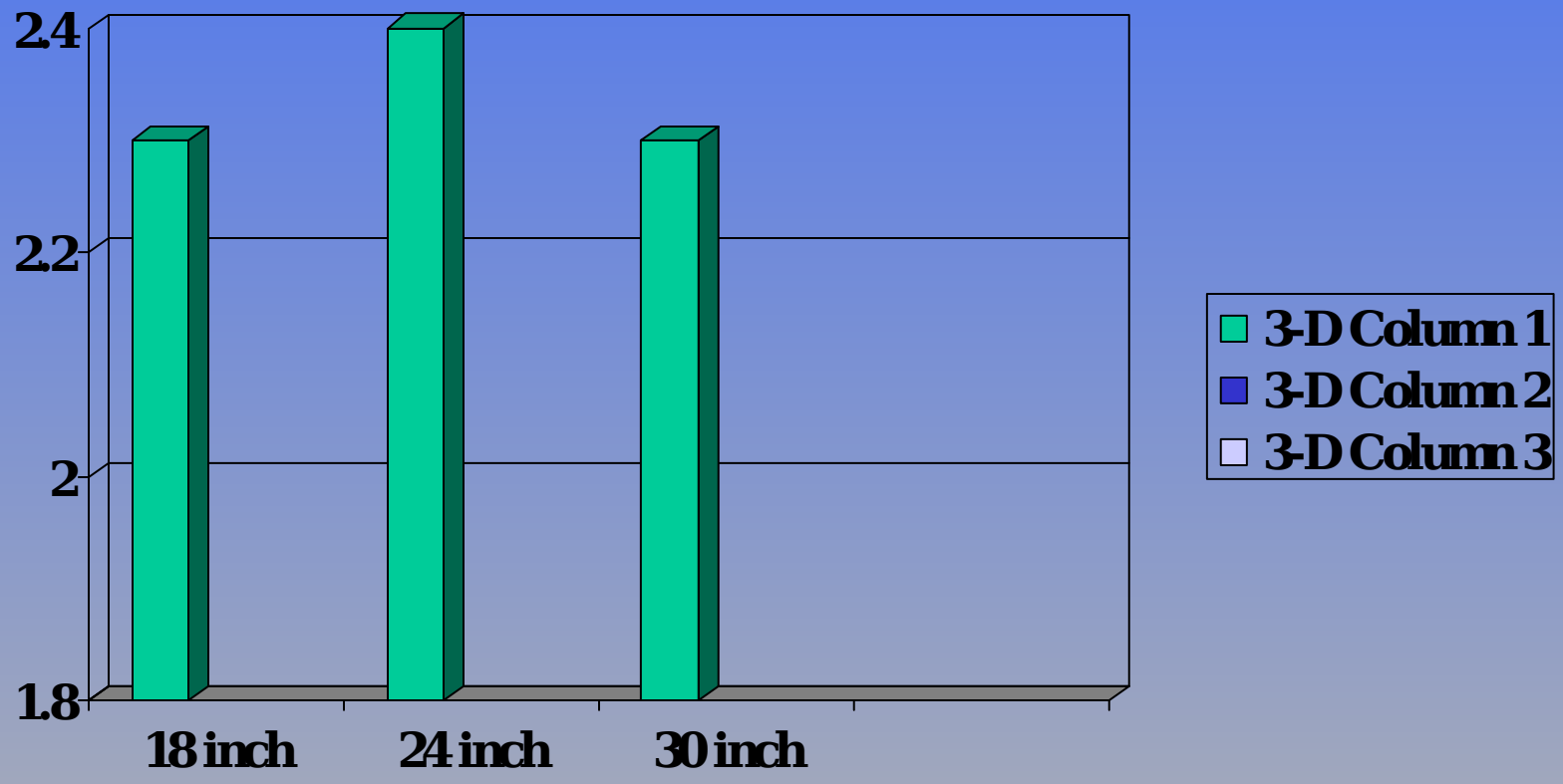
Sagebrush Survival (Percentage)



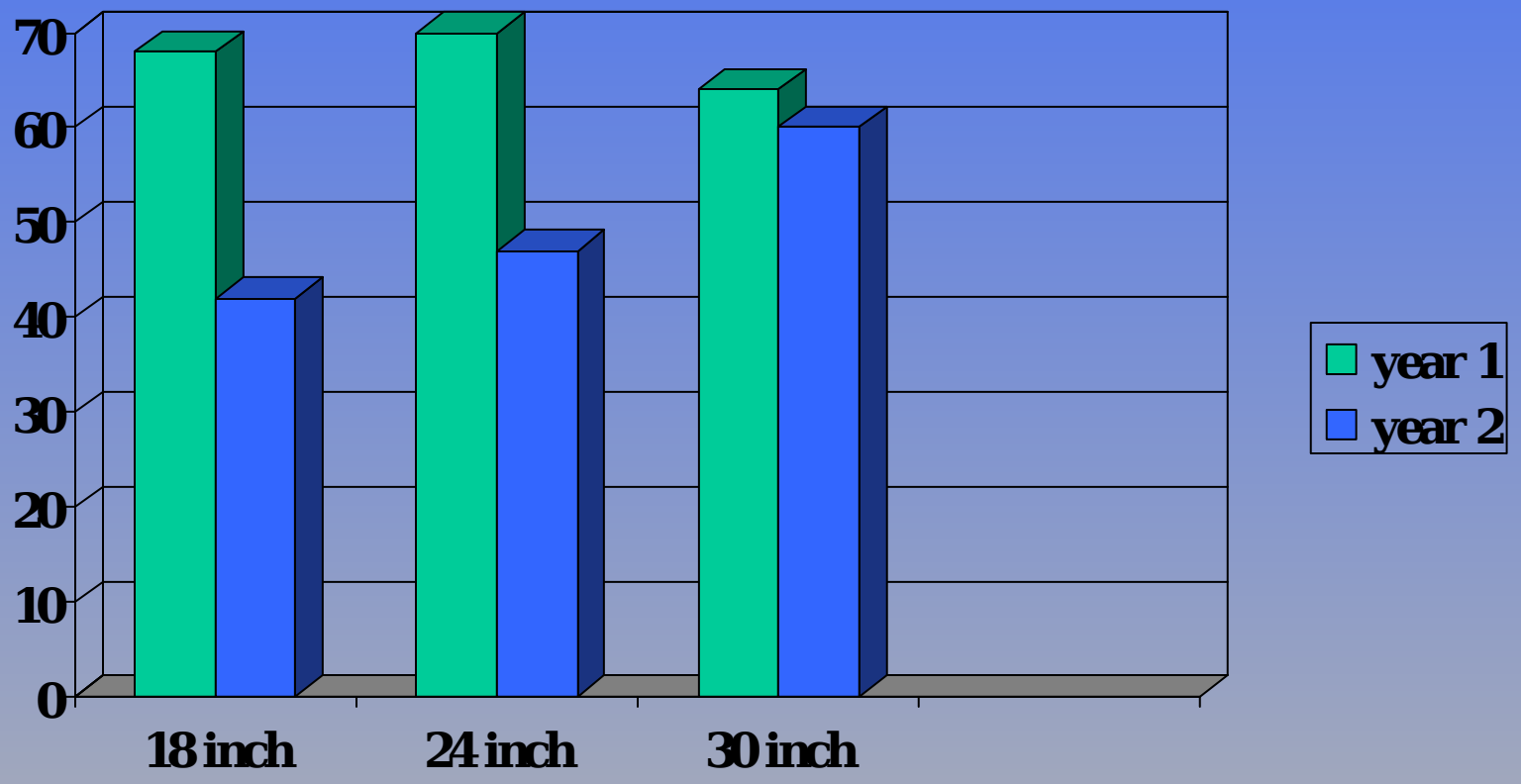
Sagebrush Condition Rating of Surviving Plants



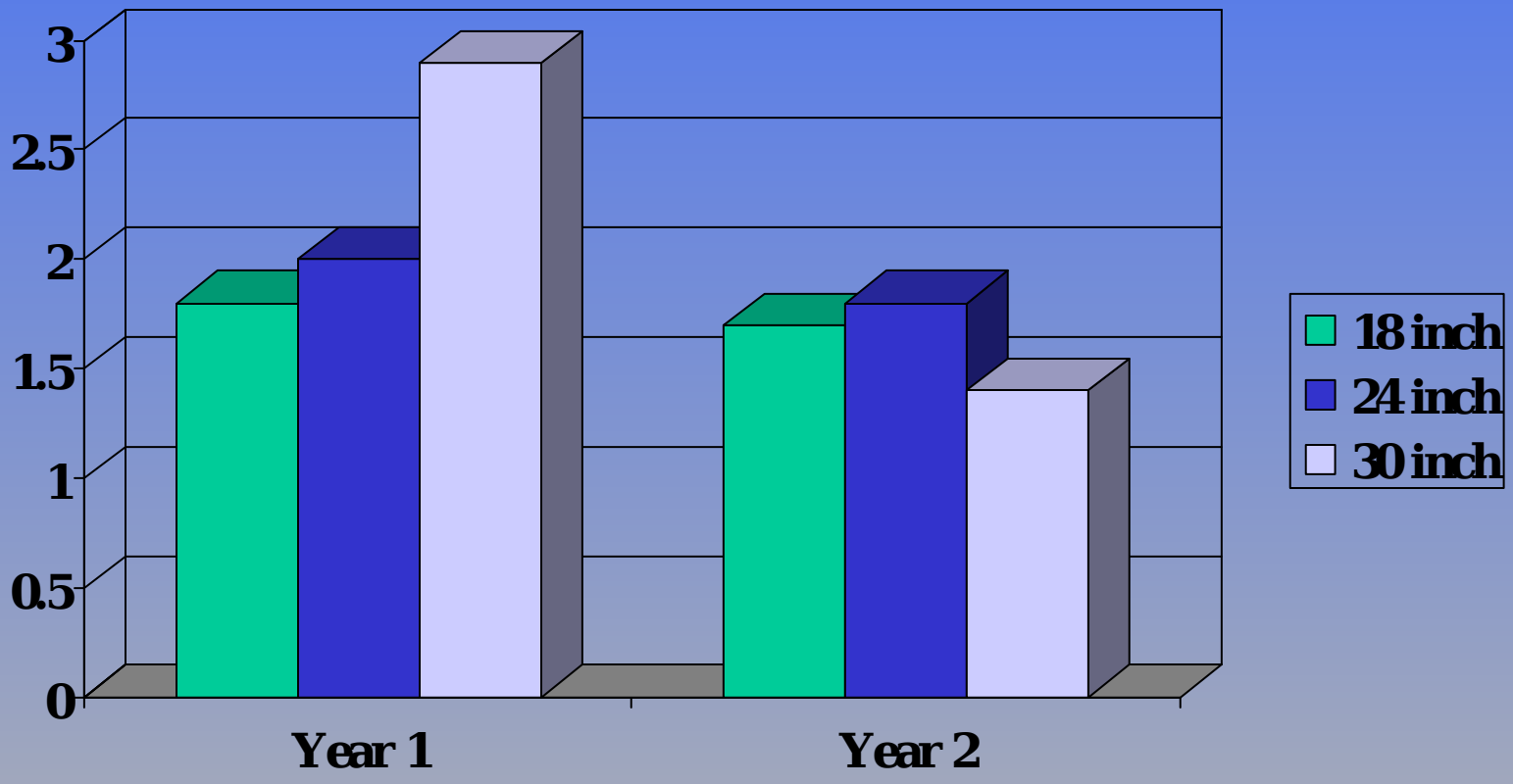
Sagebrush Condition Rating of Surviving Plant



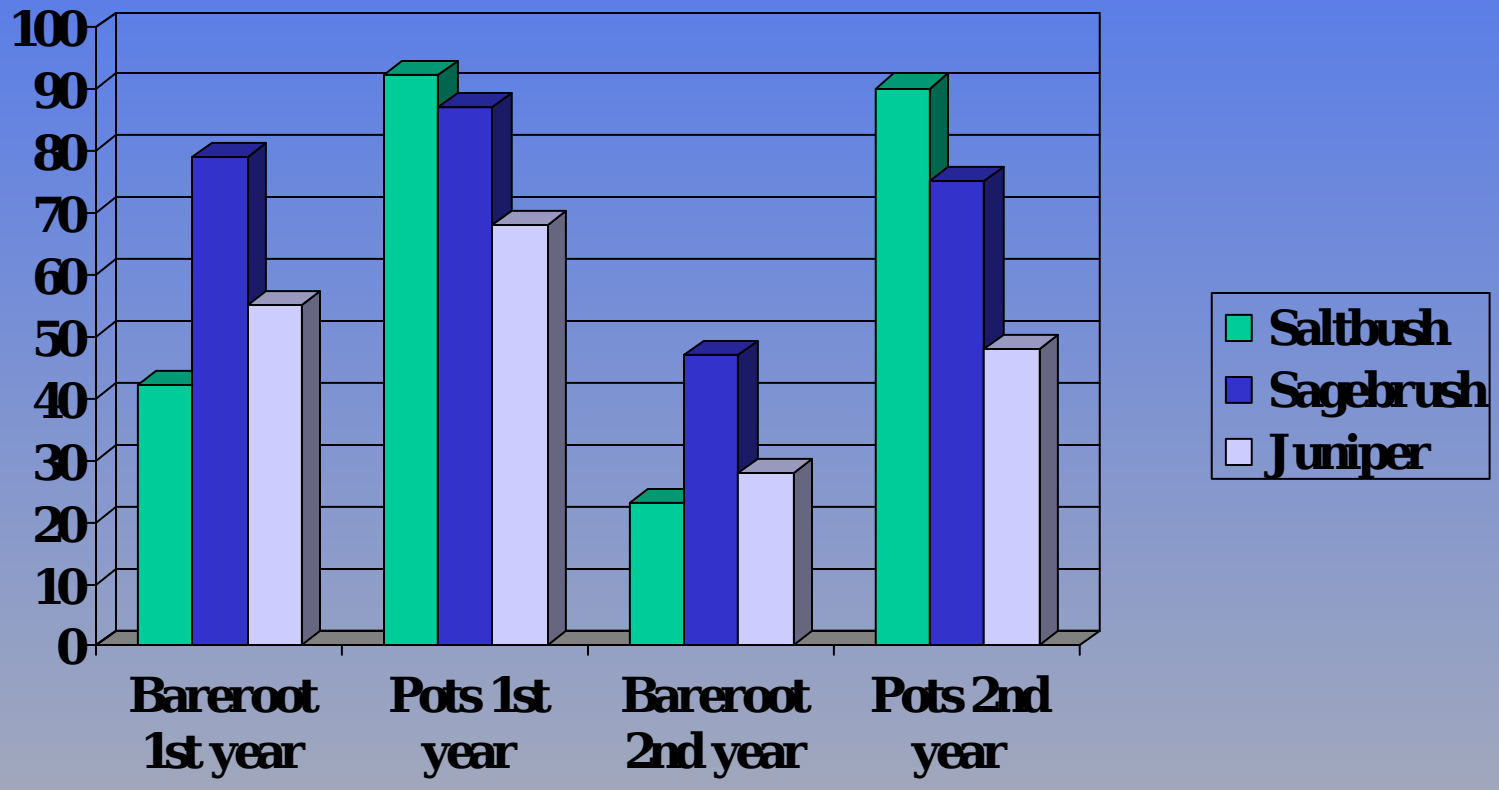
Juniper Survival (Percentage)



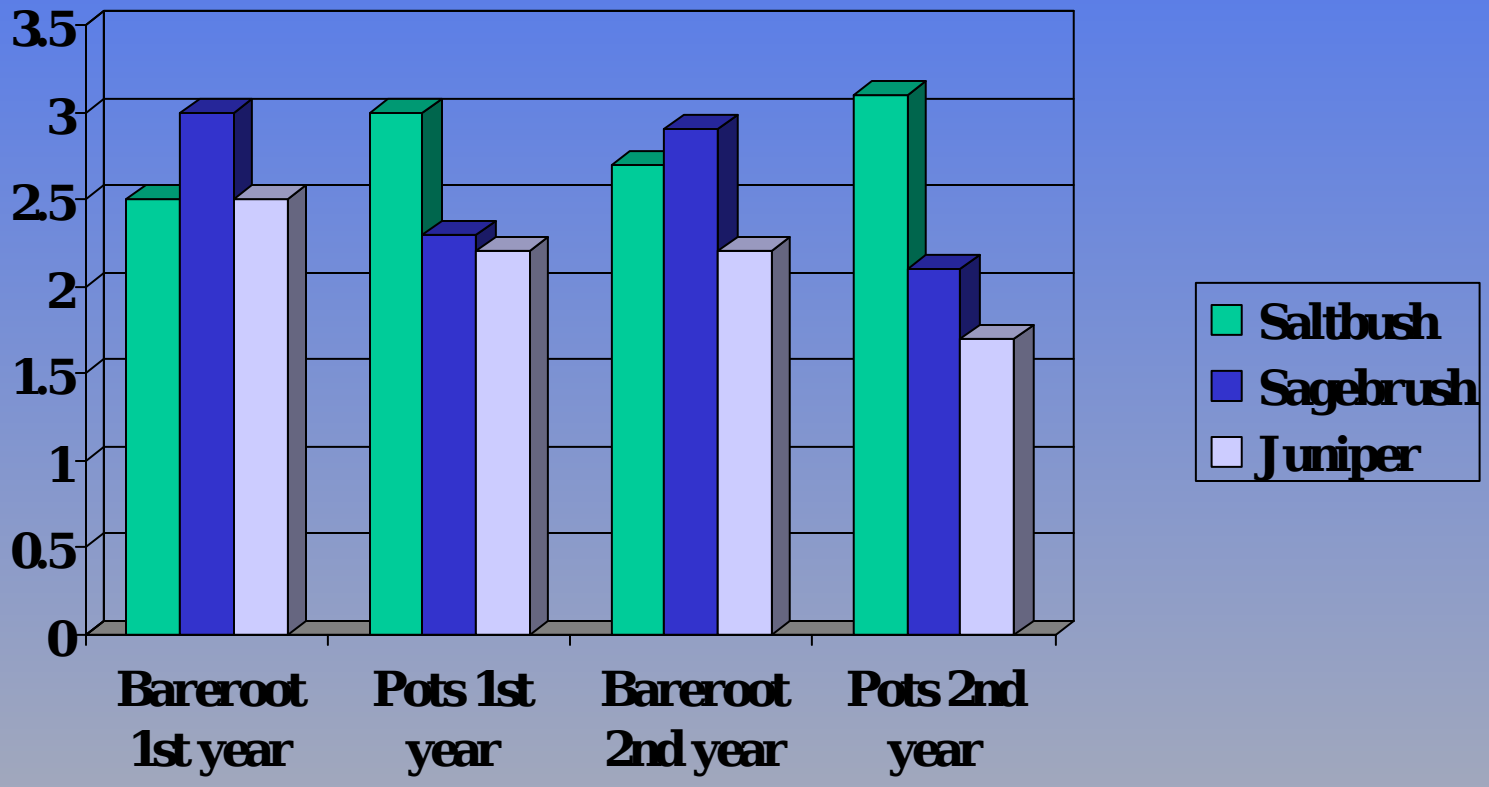
Juniper Condition Rating of Surviving Plants



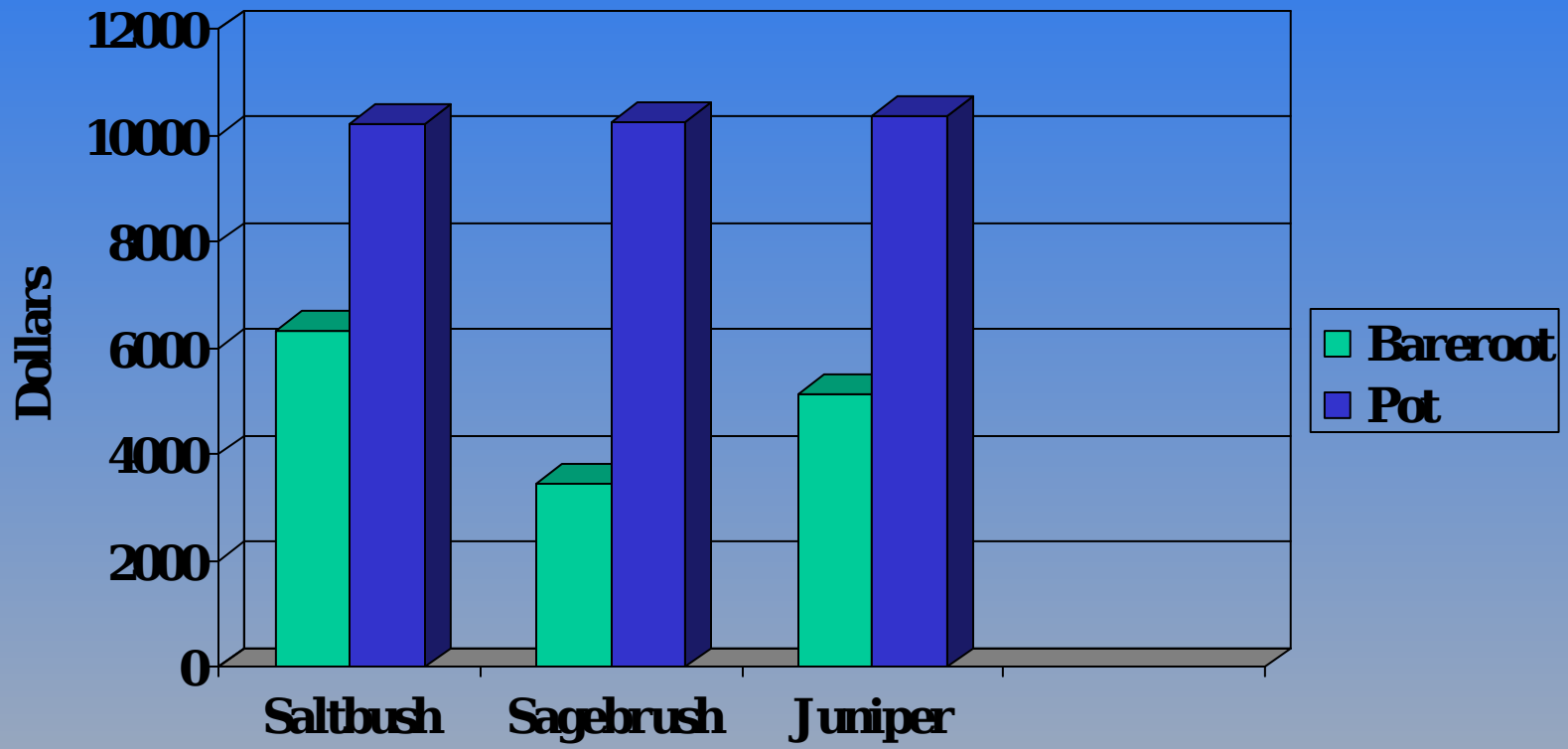
Survival Comparison of Bareroot & Elongated Root



Condition Comparison of Surviving Bareroot & Elongated Root



Cost Estimate to Establish 1000 Plants



Conclusions

- Increases shrub and juniper establishment
- Doubles cost over bareroot transplanting
- Species response to pot length varies
- Reserve for saline or drier areas